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# Providing a sustainable framework for academic workspace evaluation: a literature review

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**Abstract.** This paper aims to articulate the user-centred variables in academic work environment with holistically sustainable Academic Workspace Evaluation (AWE) framework for universities. The paper considers emergent thought on academic workspace with respect to the requirement of users. Based on this point, a broad-review of literature around the variables underpinning academic workspace disposition to users' conduct is carried out. The study identifies 109 user-centred cognate variables as prerequisite of AWE. These variables fall into three basic units for ease of analysis: the organisation culture, the employees' work environment, and the academic workspace condition. Each of the three identified units must contribute respectively to meeting the desired condition of workspace in its holistic form. In other words, the success in each unit affects the success of the other two units. Furthermore, the quality of the workspace depends entirely on the corporate interaction and interrelationship of the three units. However, differences in culture, system, process, modes of work operations, purpose and objectives between universities presents difficulties to generating a holistic universal user-centred AWE framework. It is therefore inappropriate to strictly and absolutely adopt a universal framework for academic workspace without the inclusion of local contents for individual university flexibility. The framework is context-based designed to accommodate these local contents within the conventional structure arrangement of respective universities. The proposed AWE framework is capable to generate Universal Minimum Academic Workspace Benchmark Standard (UMAWBS) for use in universities globally.

## 1. Introduction

The issue of academic workspace standardisation is attracting global debate in recent time. This is due to emergent new order in the world of work. Information and Communication Technology (ICT) has turned the mode, pattern and style of carrying out office work around in the contemporary time. In consequence, the whole world has become a global village connected by electronic communication systems. The impact on the contemporary time world of work has effects on the academic work.

Academic is unique everywhere in the world and is currently witnessing evolutionary changes in diverse emergent areas. For example, barriers and trends have shifted in the frontiers of knowledge-based work particularly in the emerging definition of academic activities. Secondly, commercialisation of research findings has moved beyond territorial boundaries. Researchers are more involved in team work and collaborations outside their immediate work environment. For these and many other reasons, standardisation of academic workspace to take care of employee wellbeing, comfort, satisfaction, effectiveness, performance and productivity is contemporarily globally expedient.

The thought of AWE framework is therefore conceived on four key theories underlying operations in work environment. These are the theory of organisation culture, the theory of healthy work environment, the theory of workspace comfort and, lastly, the theory of knowledge-work in a changing world of work.



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## 2. Literature Review

The academic workspace is viewed as chains of spaces: one workspace connects to the other in series of chains; the user occupying one of it as office; is connected to other spaces for successful accomplishment of duties. Examples of such multidisciplinary workspaces in academic are the classrooms, workshops, studios, libraries, laboratories, seminar and conference halls, lecture theatres, etc. These facilities are connected to hallways, passages and elevators as another set of facilities required to link other work-groups. Furthermore, academic workspace extends beyond the building envelope to include the circulation paths, the meeting rooms, the cafeteria, coffee station, as well as the support spaces such as copier rooms, stairs or elevators, and the parking space ([23]; [26]; [39]). When workspace is designed for learning, teaching, demonstration, research, and similar support services for common scholarly objective, it is viewed as academic workspace. Important variables which define the quality of work environment are generically required for effective workspace. These include the natural lighting quality, space shape, room temperature, location of space, access and circulation within the room space, noise level, floor surface finishes, interior beauty, ventilation, room humidity, air quality, air freshness, and electric lighting comfort ([7]; [30]; [29]; [41]). Glare, auditory distraction, drafts and office furniture configuration also constitute elements to consider in assessing work environment ([9]; [40]; [2]).

[6], suggested that work environment must operate as system, process, structures, with a provision that should motivates staff at work. In the opinion of [41], the Quality of Work Life (QWL) is a strong determinant of Quality of Life (QoL) after work and so should be considered in the evaluation of work environment.

Another important factor to consider in work environment assessment is the office furniture. These consist of desks, chairs, the filing cabinet, shelves, drawers, accessories for lights. [5] referred to it as ergonomic and defined it as the scientific discipline that deals with human interactions and other elements of a system. Nonetheless, it is the relationship that exists between tool, equipment, and the office as the extension of the user [37]. Furniture ergonomic consideration extends to user friendliness with shelves, cloaks, interior decorations, and the immediate ambient environment ([35]; [25]; [32]).

The impact of ICT has affected academic work and the learning environments in recent time. The method of teaching has changed from the “instruction paradigm” to “learning paradigm.” Similarly, education in modern time has changed the emphasis on factual knowledge to ability to think critically and solve complex problems [17]. Because of this reshape, buildings and other academic infrastructure are currently designed for flexibility to meet the need of users and primarily to enhance quality of life that supports the learning experience [18]. The contemporary time academic workspace models have evolved to consider the physical internal environmental factors more in ensuring user’s comfort in the design of workspace, particularly in areas pertaining to adequacy of work area, good ventilation, unobstructed flow of fresh air, free movement within workspace, undisturbed entry and exits, provision of toilet and convenience facilities, sanitary facilities, rest and changing rooms, non-slippery floor finishes to ensure good health, effectiveness, comfortable and home-like work conditions ([3]; [12]; [19]; [21]; [36]; [31]; [42]).

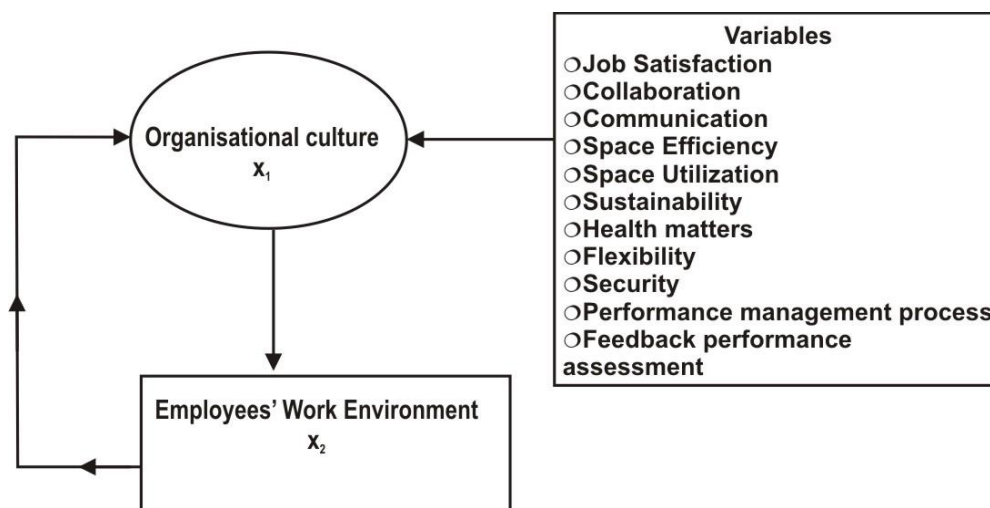
The crux of the innovations and researches in technological advances in academic in recent time is based on experience of the fluidity of multi-dimensional academic activities which has no definite boundaries for individual solo assignment any longer [28]. This is expected to be considered in assessment of academic work environment. Hence, a review of the interrelationship between the various segments of academic work environment is presented. This is to articulate required variables of sustainable academic workspace assessment.

## 2.1. Theoretical Framework

Certain theories provided the basic generic variables of an ideal work environment condition for effective performance assessment. The theory of organization, its culture in relation to employee productivity was propounded by Schein Edgar in 2004. The theory of healthy work environment is based on skilled communication, true collaboration, effective decision making, appropriate staffing, meaningful recognition and authentic leadership. The theory was propounded by Marshelle Tobaben in 1996. The theory of workspace comfort was propounded by Vischer Jacqueline in 2007. This theory encompasses the space user's experience of ambient environmental conditions, ergonomics, functional comfort, furniture, health and safety, office layout, productivity, territoriality, satisfaction of the office. The theory of knowledge-based work and the changing world of work was propounded by Judith Heerwagen, Kelvin Kampschroer, Kelvin Powell and Vivian Loftness in 2004 with the aim to explaining the increasing changing world of work caused by the impact of new network technologies (ICT) on workplace and workspace designs. This particularly reflects the fluidity nature of the contemporary time academic activities within the emergent work modes in universities [1]. Contextually, the variables generated from these theories were linked to academic environments as explained in the next sections.

## 2.2 Organization Culture in the Academic Environment ( $x_1$ )

The management of university operations are branded in Policy statements, organization control and communication pattern that influences the culture of individual university organization. The virtual environment is profoundly indicative in academic environment than in other types of organization setting. Consequently, virtual learning is increasingly made possible with positive impacts of ICT tools on globalization of ideas, knowledge, and professional teams from diverse disciplines and time zones [22]. This is essential in contemporary time learning.



**Fig 1: Impact of Organizational culture on Employees' Work Environment and the feedback system**

**2.2.1 Organization Culture Measure ( $x_1$ )** The organizational culture variables identified suitable for academic workspace evaluation in this context include: (i) use of performance management process for goal setting (ii) feedback to assess employee's performance (iii) consideration of employee's suitability for assigned responsibilities or workloads (iv) employees' variability to due process (v) opportunity of employee getting supervisor's support (vi) provision of training/mentoring/coaching to

update employees skills and performance at work (vii) opportunity to apply newly acquired skills in their jobs (viii) employees motivation to boost commitment to work (ix) provision of job aid to make work easier for workers and to minimize error rates (x) workplace attention to overcrowding, office layout, hygiene, aesthetics, ventilation, air quality, etc. (xi) communication pattern amongst employees and between employee and authority (xii) use of hierarchy in routine administration or team work (xiii) use of dress code (xiv) allocation of workspace per employee (xv) existence of working pattern for workplace (xvi) workplace consideration of employee behavioural pattern (xvii) rate of office politics or gossip in the workplace (xviii) management approach in handling disputes within workplace (xix) workplace encouragement to promote staff interest in innovation and experimentation (xx) workplace interest in promoting team work between departments, schools, faculties, external bodies or institutions. (xxi) allow employees take initiatives on their own (xxii) workplace seriousness in area of documentation (xxiii) workplace in area of efficiency (xxiv) workplace in area of effectiveness (xxv) presence of criticism among employees in the workplace. The operation of these variables is considerably based on the perception of respondents. The equation developed for the measurement is:

$$MEI_i = \frac{\sum_{i=1}^N ki}{N} \quad (1)$$

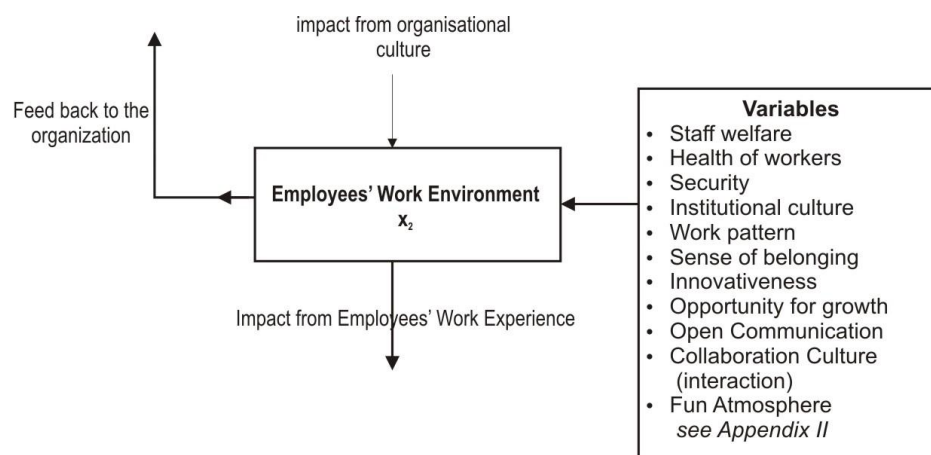
where:

$MEI_i$  is the mean impact indices for performance attribute  $i$ ;  $ki$  is the impact rating for attributes  $i$ ;  $N$  is the total number of respondents;  $i$  in this formula is organisation culture.

### 2.3 Employees' Work Environment ( $x_2$ )

[8] considered the increasing changing world of work induced by new network technologies and the exigencies in academic developments. Hence, the author resolved into carrying out studies on the relationship between Organizations, Buildings and Information Technology (ORBIT). Result from the ORBIT model studies discovered that there is no static relationship between the organisation, buildings as the enabling structure and the innovation changing IT. The latter impacts work modes and styles beyond the control of the organisation. The variableness of work in the model is therefore defined by the extent to which the organization's goals are routine/predictable or varied/unpredictable.

The academic workspace in this regard would derive its power to be suitable and effectively positioned to encourage individual workers' output towards organisational productivity and goal achievement. In other word, the relationship between ( $x_1$ ) and ( $x_2$ ) is determinant and provides an overbearing effect on the workspace condition ( $x_3$ ).



**Fig 2: Impact of Employees' Work Environment on the condition of workspace and the feed back system**

**2.3.1 Employees' Work Environment Measure ( $x_2$ )** Employees' work environment variables identified suitable for AWE in this regard include: (i) Staff welfare (ii) Health and Safety (iii) Security (iv) Institutional Culture (v) Work pattern (vi) Sense of belonging (vii) Innovativeness (viii) Opportunity for growth (ix) Open communication (x) Collaboration culture (interaction) (xi) Fun atmosphere. The equation generated for the measurement is:

$$MEI_j = \frac{\sum_{j=1}^N kj}{N} \quad (2)$$

where:

$MEI_j$  is the mean impact for performance attribute  $j$ ;  $kj$  is the impact rating for attributes  $j$ ;  $N$  is the total number of respondents;  $j$  in this formula is the work environment.

## 2.4 Academic Workspace

The bedrock of functionally suitable and effective workspace is its ability to provide maximum comfort for users' optimum productivity. This issue should be included as the enabling environmental factors for standardization of global academic workspace for international academic work collaboration.

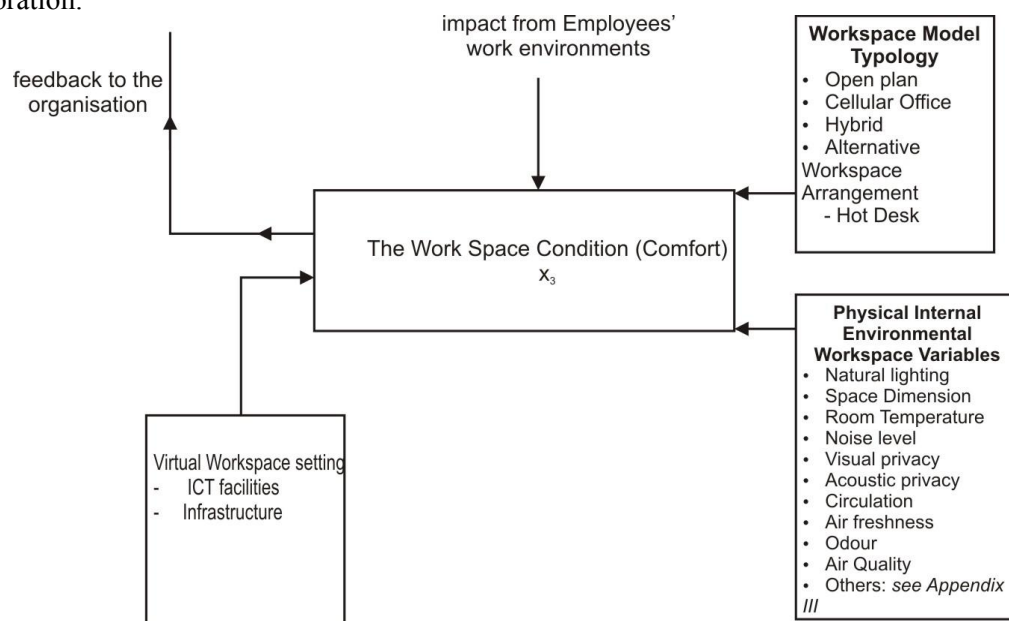


Fig 3: The Impact of both organizational culture and the condition of Employees Work Environment on the level of comfort provided in the workspace and the feedback system

**2.4.1 Workspace Condition Measure ( $x_3$ )** The virtual workspace setting, physical internal environmental academic workspace attributes, and the academic workspace design models are very important to workspace condition assessment ([37]; [38]; [16]; [44]). The variables identified to be associated with quality of effective academic workspace evaluation include: (i) academic workspace attributes of environmental dimension: natural lighting quality, space dimension, room temperature, noise level, visual privacy, acoustic privacy, room humidity, room ventilation, circulation within room space, air freshness, air quality, odour, electric lighting comfort, floor surface safety, interior beauty, and location of room space. (ii) type of academic workspace design model in use: open-plan; cellular office; hybrid or diverse hybrid (collaborative workspaces: bullpen or pod, informal teaming spaces, non-territorial, high mobility office, radical collocation project room, and extreme collaboration project room); enclosed space plan; and Alternative Workspace Arrangement (AWA). (iii) provision



of virtual workspace setting (that examines level of ICT compliance and available Infrastructure) like the virtual desktop, mobile technology, etc. The equation developed for the measurement is:

$$MEI_m = \frac{\sum_{m=1}^N km}{N} \quad (3)$$

where:

$MEI_m$  is the mean impact for performance attribute  $m$ ;  $km$  is the impact rating for attributes  $m$ ;  $N$  is the total number of respondents;  $m$  in this equation is the physical internal environmental condition of workspace.

## 2.5 Case for Holistic Framework for Academic Workspace Evaluation (AWE)

The inputs for a suitably effective and workable academic workspace evaluation structure are many and enormous, never the less its operational benefits are sacrosanct. This subsection articulates and elucidates matters of great importance in the objectives of the study. It also emphasizes the evolution of the working variables of this research. Connectivity of the key elements of consideration in the framework is shown as a structure in Figure 4.

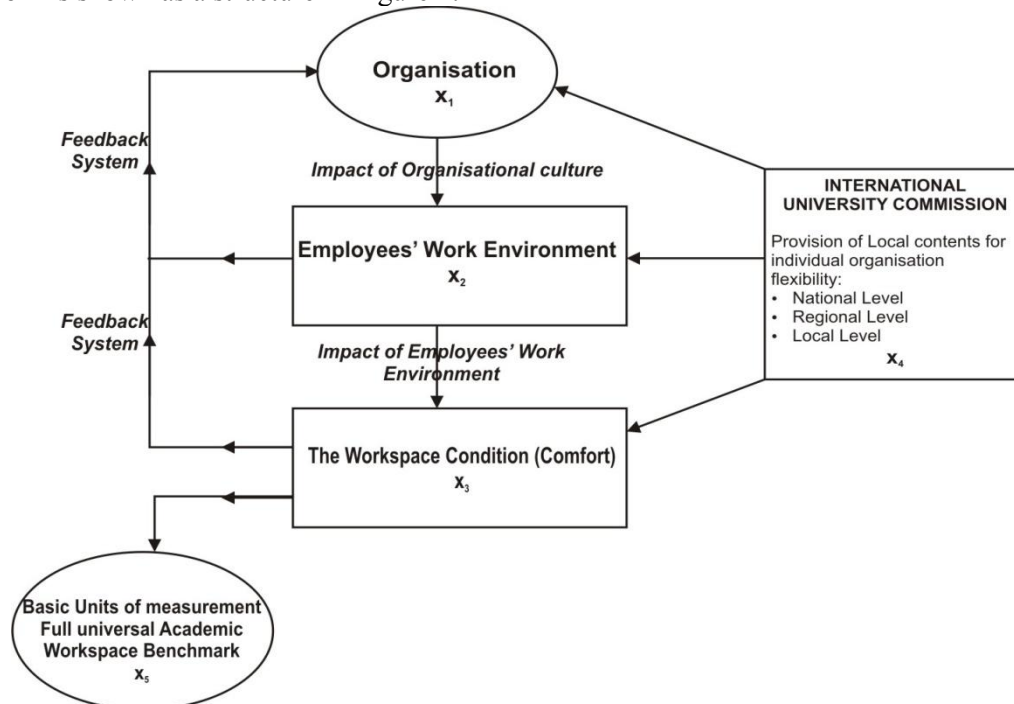


Fig.4: Author's structure of academic workspace evaluation framework indicating the articulation and connectivity of variables used as basic units of measurement.

The Model Specification for the framework is set as follows:

$$Y = f(x_1, x_2, x_3)$$

Where:

$Y$  = Academic workspace evaluation

$f$  = function of

$x_1$  = Organizational culture environment

$x_2$  = Employees' work environment

$x_3$  = The workspace condition

Variation observed in the academic workspace benchmarks generated from literature indicates lack of standardized universal benchmark for academic workspace. Universal workspace benchmark is

therefore imperative to set minimum standard for effective space use; accommodate basic modes of academic work setting and to enable ‘feel-at-home’ collaborations anywhere in the world. Setting up universal benchmark for academic workspace will give room for basic minimum standard to be expected anywhere in the world of academic. The need to meet this minimum standard will put all stakeholders in academic workspace facilities on their toes and academic leverage maintained in developing and developed countries of the world. Element (c) as indicated in the proposed framework agitates for articulation of elements (a) and (b) in achieving a universal workspace evaluation standard for academic. This calls for further studies in this direction.

### 3. Conclusion

This study has shown that gap exists in the provision of academic workspace standards globally. The inadequacy is profound in the developing countries while the standards found in a few developed countries are not uniform for universal assessment. In other word, there is lack of universal holistic academic workspace standard to compare benchmarks for minimum acceptable workspace quality among workforce across the world. There is no universally standardised AWE framework and score cards yet in place. It is reasonable in this context to assume that this framework will generate a universally acceptable standard for referencing anywhere in the world. The study has indicated the operation of the variables to achieve results. Provision is made to insert local contents in the framework to give room for individual organisation flexibility in operation. The framework is adequate to assess academic workspace standards in all areas of users’ needs. Considering the rate at which technological change occur in the academic sector to impact teaching and learning in HEIs in recent time, further research needs to focus on review periods of established standards eventually set up to keep in touch with the changing world of academic work environment.

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